Triniochloa talpensis (Poaceae: Pooideae), a New Species with Deciduous Leaves from Mexico

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ABSTRACT. *Triniochloa talpensis* from Mexico is described and illustrated. Its morphology and leaf anatomy are compared with those of *T. laxa* Hitchcock.

RESUMEN. Se describe e ilustra *Triniochloa talpensis* de México. Se comparan características de morfología y de anatomía foliar con aquellas de *T. laxa* Hitchcock.

Triniochloa is a small genus of grasses that was described by Hitchcock in 1913, the members of which grow in temperate forests from Mexico to Bolivia. It is distinguished from other genera of the Pooideae by its spikelets 1-flowered without a rachilla extension, floret callus obtuse and bearded, and lemma 5- or 7-nerved with a bifid apex and geniculate awn inserted above the middle. This genus was included in the tribe Meliceae of the subfamily Pooideae by Reeder (1968) on the basis of its connate leaf sheaths, membranous ligules, truncate lodicules that lack vascular traces, and small chromosomes. He suggested that it is closely related to *Schizachne*. This placement is supported by Clayton & Renvoize (1986) and Watson & Dallwitz (1992).

Triniochloa, as presently circumscribed, includes four species: *T. laxa* Hitchcock and *T. micrantha* (Scribner) Hitchcock, which are restricted to Mexico; *T. stipoides* (H.B.K.) Hitchcock, distributed from central Mexico to Colombia, Venezuela, and Bolivia; and *T. andina* Luces, known only from Venezuela. The new species from western Mexico increases the number to five.

Mature blades of basal leaves from herbarium specimens were used for anatomical studies. A segment about 10 mm long was removed from the middle of the blade, rehydrated by boiling in water, sectioned free-hand, and mounted in glycerin jelly. Epidermis preparations were made following Metcalfe's (1960) method. Drawings were made using an X-100-1 Ken-A-Vision Microprojector.

Triniochloa talpensis M. González-Ledesma & M. Gómez-Sánchez, sp. nov. TYPE: Mexico. Jalisco: Municipio de Talpa de Allende, alrededores de la mina Zimapán en la Sierra de Cuale, ca. 2150 m, 10 Feb. 1992, *M. González-Ledesma & J. A. Pérez de la Rosa 496* (holotype, CHAPA; isotypes, IBUG, MEXU, MICH, MO, US, XAL). Figure 1.

Plantae perennes, rhizomatosae. Culmi 60–110 cm alti. Vaginae foliorum pubescentes prope nodos. Ligulae 1.5–2.5(–5) mm longae. Laminae foliorum planae 22–27 cm longae et 3.0–5.0 mm latae inferioribus caducis. Panicula erecta, angusta, 16–34 cm longa, ex vagina exserta. Spiculae 11.0–16.8 mm longae. Glumae inaequales, prima spiculis breviore, 7.5–13.6 mm longa; secunda quam lemma aequanti vel longiore, 11.0–16.5 mm longa. Lemma 11.0–14.5 mm longum, 7-nerve, arista dorsali geniculata, 13.0–23.0 mm longa. Antherae (4.8–) 5.5–7.0 mm longae.

Perennial herbs with rhizomes to 20 cm long, 2–3 mm diam., rhizome sheaths strigose near the nodes. Culms 60–110 cm tall, 1.5–2.0 mm diam. near the base, robust, strongly decumbent, pubescent below the upper nodes. Leaves, at least the lower, ciliate near the collar. Leaf sheath margins connate, the upper sheaths shorter than the internodes and pubescent below. Ligules 1.5–2.5(–5) mm long, membranous. Blades 22–27 cm long, 3.0–5.0 mm wide, flat, deciduous at level of the collar or beneath, adaxial surface scabrous to pubescent, with prominent ribs, abaxial surface glabrous. Panicle 16–34 cm long, 1.0–2.0(–2.5) cm wide, erect, narrow, completely exserted, with 30–65(–90) spikelets; panicle axis glabrous below, scabrous on the angles toward the apex; lowest node 1–2-branched; branches appressed or ascending, scabrous at least toward the apex. Spikelets 11.0–16.8 mm long, 1-flowered. Glumes unequal, hyaline except near the nerves. First glume 7.5–13.6 mm long, shorter than the spikelet, 1-nerved. Second glume 11.0–16.5 mm long, as long as the spikelet, 3-nerved. Lemma 11.0–

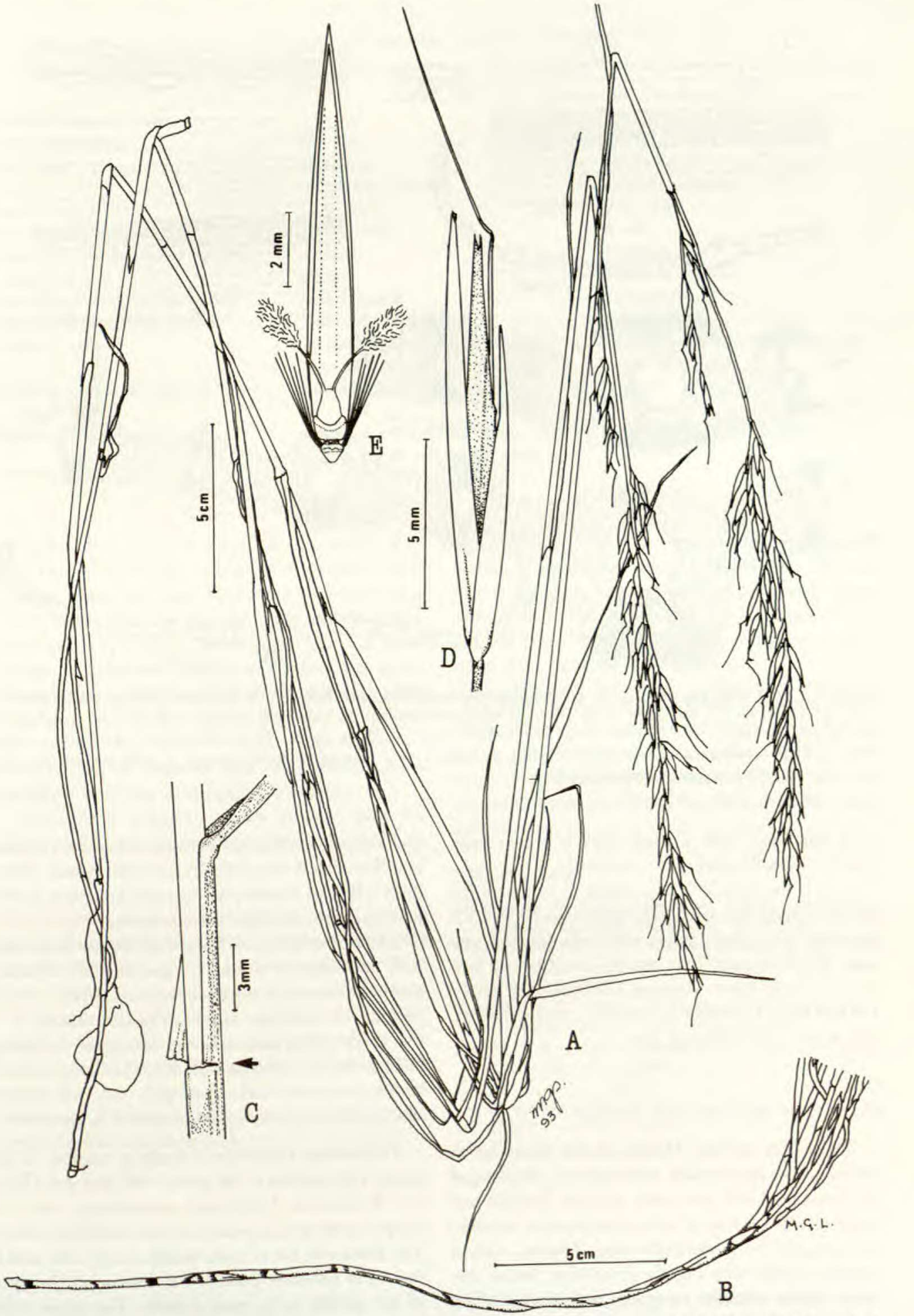

Figure 1. *Triniochloa talpensis* M. González-Ledesma & M. Gómez-Sánchez (*González-Ledesma & Pérez de la Rosa 496*, CHAPA). —A. Habit. —B. Rhizome. —C.Upper portion of leaf sheath (hairs omitted) showing line of detachment of upper sheath and blade (arrow). —D. Spikelet. —E. Floret with the lemma removed.

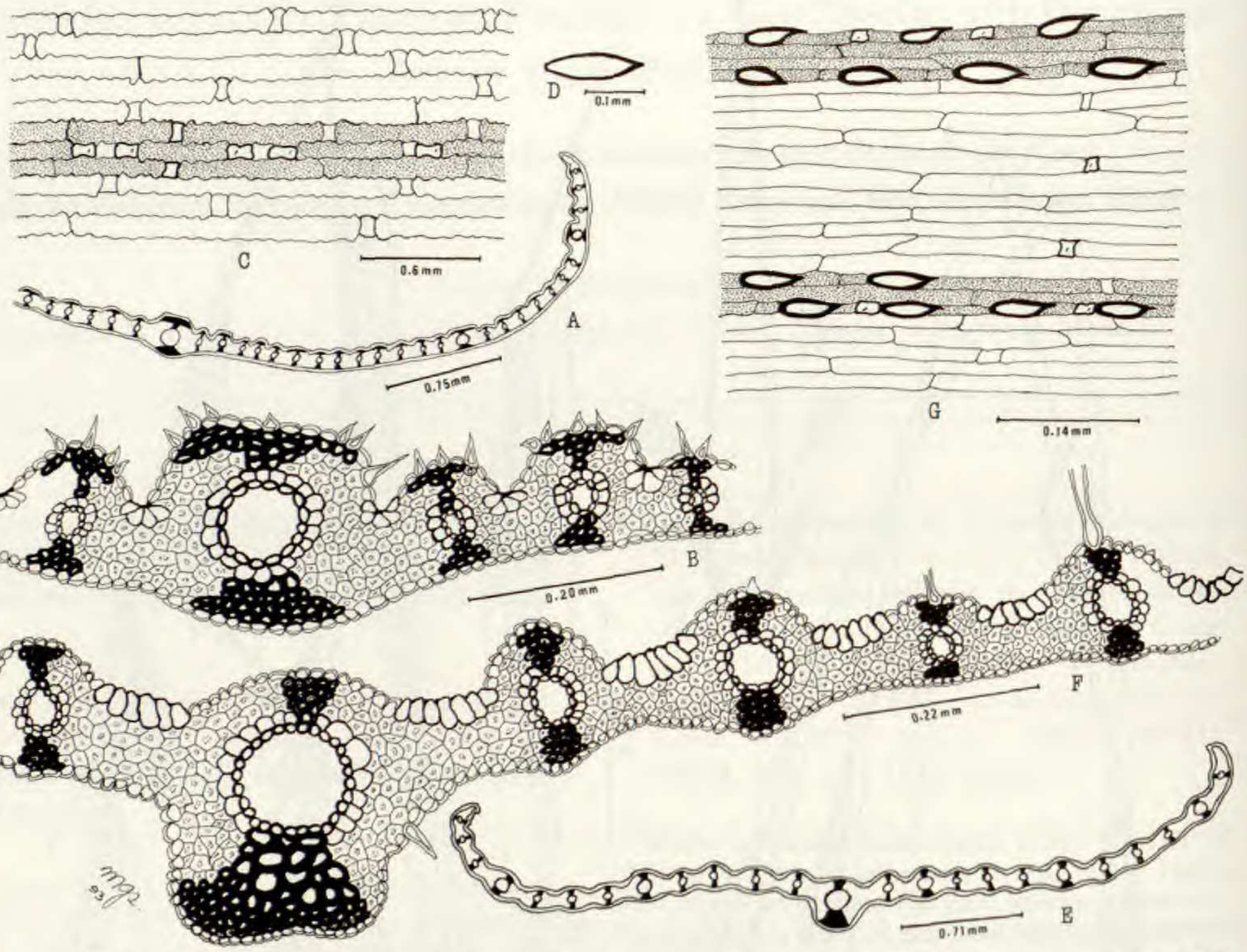

Figure 2. Leaf blade anatomy. A–D. *Triniochloa talpensis* (*González-Ledesma & Pérez de la Rosa 496*, CHAPA). —A. Outline of half of the blade. —B. Detail of transverse section, including the midrib. —C. Abaxial epidermis as seen in surface view. —D. Prickle. E–G. *Triniochloa laxa* (*T. Mejía-Saulés 1820*, CHAPA). —E. Outline of the blade. —F. Detail of transverse section, including the midrib. —G. Abaxial epidermis as seen in surface view. Stippling indicates the costal region in both C and G.

14.5 mm long, with a basal stipe 0.5 mm long, rounded dorsally, glabrous or scabrous at the apex, 7-nerved, the central 3 converging at or above the middle to form the awn; apex bifid; awn 13.0–23.0 mm long, geniculate; callus with hairs up to 5 mm long. Palea shorter than lemma. Rachilla not prolonged beyond floret. Stamens 3, anthers (4.8–)5.7–7.0 mm long. Lodicules 2, rounded, connate, short, and turgid. Caryopsis not seen.

LEAF BLADE ANATOMY (FIG. 2A–D)

Transverse section. Outline of the blade flat to involute. Adaxial surface with squared, flat-topped ribs associated with first-order vascular bundles and rounded ribs associated with second-order bundles; furrows narrow, moderately deep. Abaxial surface smooth, midrib only slightly projecting. Outer vascular bundle sheaths complete or interrupted by abaxial or adaxial sclerenchyma, round in outline. Sclerenchyma girders present, the adaxial T-shaped. Chlorenchyma nonradiate, its cells of various sizes and shapes, continuous between adjacent vascular bundles. Colorless parenchyma cells absent. Bulliform cells in fan-shaped, adaxial groups not projecting above the adjacent epidermis.

Abaxial epidermis. Long cells longer than wide with undulating anticlinal horizontal walls. Stomata absent. Intercostal short cells solitary, square or tall and narrow. Papillae absent. Prickles absent, or a few in the costal zone near the margin of the blade. Silica cells in costal zone with dumb-bell-shaped silica bodies, sometimes associated with cork cells. Costal short cells solitary or in pairs, seldom in short rows.

Triniochloa talpensis is clearly a member of the genus *Triniochloa* in its anatomical features (Watson & Dallwitz, 1992) and morphology, but it is unique in the genus because of its deciduous leaves. The basal and lower culm leaves simply die, and if the blade becomes detached it does so at the apex of the sheath, as in most grasses. The upper culm leaves have a special way of separating: when they are mature and dry, the blade and the portion of the sheath above the point of closure separate in

TABLE 1. Salient characters distinguishing *Triniochloa talpensis* and *T. laxa*.

Character	*T. talpensis*	*T. laxa*
Rhizome diameter (mm)	2.0–3.0	0.8–1.0
Plant height (cm)	60–110	40–80
Leaf blade	deciduous	persistent
Panicle	completely exserted	partially exserted
Panicle length (cm)	16.0–34.0	7.0–13.0
Spikelets per panicle	30–65(–90)	6–18
Adaxial ribs of first-order bundles	squared	rounded
Adaxial furrows	narrow	wide and shallow
Abaxial projection of the midrib	inconspicuous	conspicuous
Adaxial sclerenchyma girders	T-shaped	I-shaped
Bulliform cells	fan-shaped groups not projecting above the epidermis	rows projecting above the level of the epidermis
Anticlinal horizontal walls of long cells	undulating	straight
Prickles (abaxial epidermis)	absent or a few in the costal zone near the margin of the blade	abundant in all costal zones

one piece from the remainder of the sheath (Fig. 1C). This is especially noticeable in pressed, dried material when the upper blades are moved in order to expose the ligule or when they are slightly pulled. Detachment is along a well-defined line, but there is no articulation nor evidence of an abscission layer. Detachment was not seen in fresh material when the plants were collected and pressed. It appears that an abscission layer develops when the plants are drying. This suggests that the phenomenon is possibly a response to drought conditions.

Triniochloa talpensis grows in open pine-oak forests and is only known from the Sierra de Cuale in the municipio of Talpa (whence the specific epithet), state of Jalisco, in the western part of the Eje Neovolcánico. It is closely related to *T. laxa*, a species that grows in forests of spruce and pine mixed with poplar, and is restricted to the northern Sierra Madre Occidental in the state of Chihuahua.

Although both species have rhizomes and similar spikelets, *Triniochloa talpensis* is more robust than *T. laxa*, and there are various other characters that distinguish them (Table 1). In addition, important anatomical differences were found in the arrangement of the adaxial sclerenchyma, the protrusion of the bulliform cells, the shape of adaxial ribs, the abundance and distribution of the prickles, and other features (Fig. 2, Table 1). Deciduous leaves, narrow adaxial leaf furrows, and more abundant adaxial prickles (Fig. 2B) suggest that *T. talpensis* is adapted to drier habitats than *T. laxa*.

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